

A New Record of *Betaeus gelasinifer* Nomura and Komai (Decapoda: Caridea: Alpheidae) from Korea

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ABSTRACT

An alpheid shrimp *Betaeus gelasinifer* Nomura and Komai, 2000 new to Korean waters is described and illustrated based on two specimens collected from Changseon and Ulleungdo Island, Korea. This is the first record of *B. gelasinifer* outside Japanese waters. *B. gelasinifer* is readily separated from *B. granulimanus* Yokoya, 1927, the only member of *Betaeus* from Korea by the morphological differences in the first pereopods and the diaeresis of uropod. Brief note on the armature of cutting edge of the chela of the left first pereopod in Korean female specimen of *B. gelasinifer* is provided.

Key words: new record, *B. gelasinifer*, *Betaeus*, Alpheidae, Korea

INTRODUCTION

The genus *Betaeus* belonging to the family Alpheidae is characterized by the first pereopods as being equal or subequal, not carried flexed, bearing the chela inverted with the dactylus below the fixed fingers, and the stylocerite distinctly overreached the first segment of antennule (see Holthuis, 1993). Fifteen species of *Betaeus* have been currently reported worldwide (Nomura and Komai, 2000). Exclusive of *Betaeus lillianae* Boschi, 1966 known from the Atlantic coast of South America, the remaining 14 species have been reported from temperate waters of the Indian and Pacific Oceans (see Nomura and Komai, 2000). One of these, *Betaeus granulimanus* Yokoya, 1927 is the only member of the genus *Betaeus* from Korean waters (Kim and Kim, 1997).

During a fieldwork off Changseon (southern Korea) in 1999 and Ulleungdo Island (eastern Korea) in 2006, two specimens of *Betaeus gelasinifer* Nomura and Komai, 2000 were collected by Dr. S.H. Kim. Of these, one female from Ulleungdo Island was ovigerous. The ovigerous female was transported to the laboratory, and its first zoea was successfully obtained. A paper on the first zoeal morphology of *B. gelasinifer* will be prepared in a separate work. *B. gelasinifer* is a new record for the Korean alpheid fauna. Korean specimens of *B. gelasinifer* are described and illustrated herein. The specimens used in this study were deposited in

the Invertebrate Resources Bank of Korea (IRBK), Seoul National University, Korea. The abbreviation cl is used for carapace length, as measured from the anterior margin to the midpoint of the posterior margin of the carapace.

SYSTEMATIC ACCOUNTS

Phylum Arthropoda Latreille, 1829

Class Crustacea Brünnich, 1772

Order Decapoda Latreille, 1802

Infraorder Caridea Dana, 1852

Family Alpheidae Rafinesque, 1815

Genus *Betaeus* Dana, 1852

Type-species: *Betaeus truncatus* Dana, 1852: 23.

¹**Betaeus gelasinifer* Nomura and Komai, 2000

(Fig. 1A)

Betaeus gelasinifer Nomura and Komai, 2000: 45, figs. 1-4.

Betaeus sp.: Nomura et al., 1998: 43, fig. 1K.

Material examined. 1 ♀ (cl 5.0 mm) between oysters on the rock in the intertidal zone, Jindong (Changseon), 24 November 1999 (S.H. Kim), IRBKAR003762; 1 ♀ (cl 4.9 mm) by SCUBA diving, depth unknown, Daepoongchui (Ulleungdo Is.), 22 June 2006 (S.H. Kim), IRBKAR003763.

Description. Body (Fig. 1A) robust. Rostrum (Fig. 1B) absent. Carapace (Fig. 1A, B, C) with frontal margin exceeding anterolateral margin, moderately indented medially; orbital hood well developed, unarmed anteriorly; anterolat-

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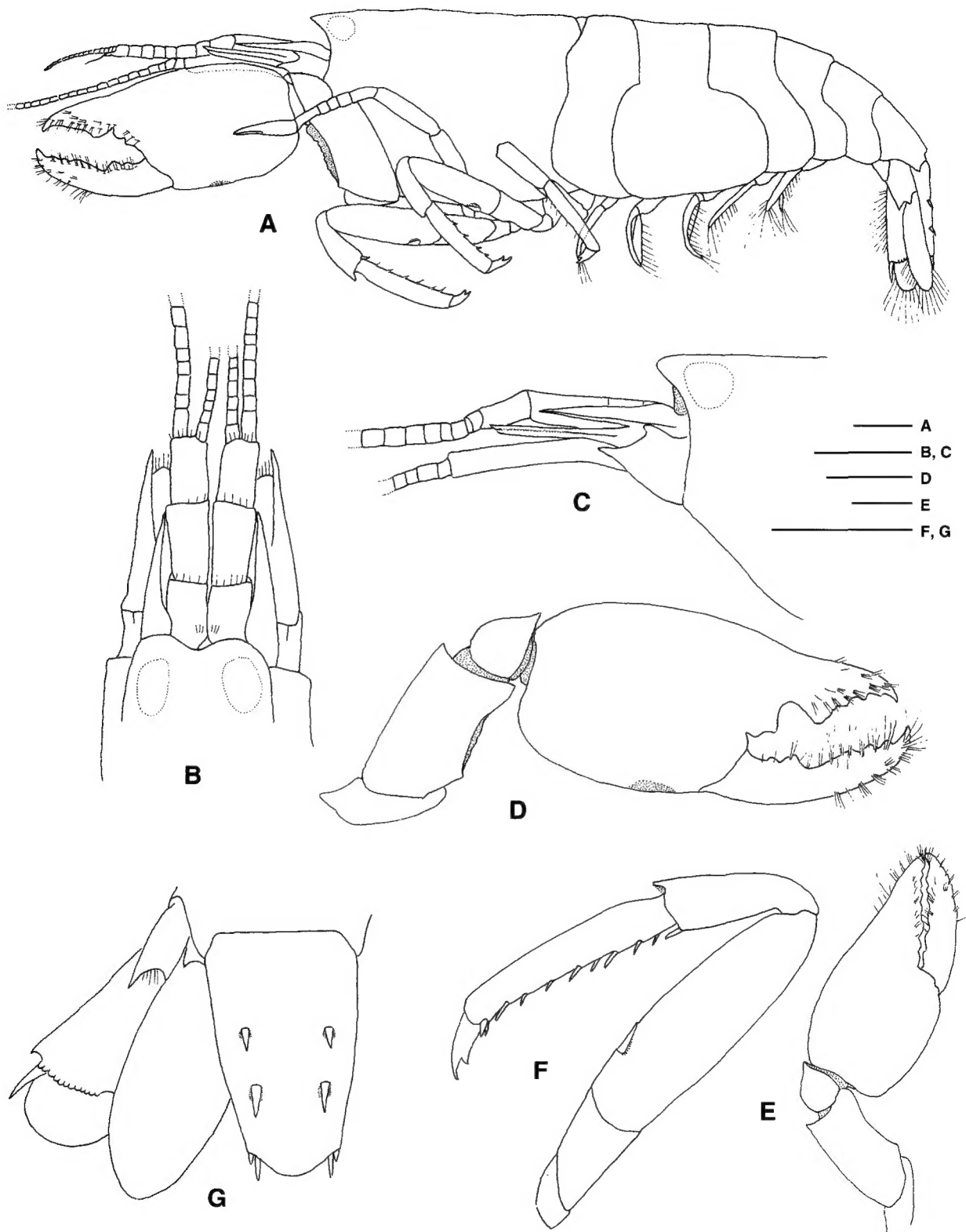


Fig. 1. *Betaeus gelasinifer* Nomura and Komai, 2000. A, habitus, lateral; B, anterior carapace and cephalic appendages, dorsal; C, same, lateral; D, left first cheliped, lateral; E, right first cheliped, lateral; F, left third pereopod, lateral; G, telson and left uropod, dorsal. A-G, female (cl 4.9 mm, catalog number IRBKAR003763). Scale bars=1 mm.

eral margin unarmed; pterygostomial angle broadly rounded. Eyes (Fig. 1A, B) covered by anterior part of carapace in dorsal and lateral views. Antennular peduncle (Fig. 1B, C) overreaching distal margin of blade of antennal scaphocerite; second segment 2.14 times as long as broad, 1.50 times longer than visible part of first segment; third segment subequal to visible part of first segment in length; stylocerite distally acute, reaching 0.86 length of second segment. Antenna (Fig. 1B, C) with basicerite bearing strong ventrolateral tooth; lateral margin nearly straight; distolateral tooth strong, distinctly overreaching distal margin of rounded blade; carpocerite overreaching distal end of antennular peduncle.

First pereopods (Fig. 1A, D, E) unequal, not carried flexed; chelae strongly compressed laterally, inverted, thus dactylus on ventral side, considerably variable in shape and armature of cutting edges. Left first cheliped (Fig. 1D) with dactylus about 0.98 times as long as palm, terminating acute tip, cutting edge with row of low, obtuse teeth interspersed by thin ridges, shallow notch at about midlength; fixed finger terminating in acute tip, crossing with tip of dactylus, with cutting edge bearing prominent notch slightly proximal to midlength, its remaining margin armed with row of low teeth interspersed by thin ridges; prominent hiatus present between dactylus and fixed finger (not shown); palm with dorsal surface smooth, lateral and mesial surfaces smooth, without granules or tubercles, ventral surface with shallow excavation nearly proximal to base of dactylus; carpus short, cup-shaped; merus 1.75 times longer than greatest depth, dorsal margin bluntly ridged, produced distally in subacute process, lateral margin without setae, ventromesial margin with row of small tubercles; ischium with dorsal surface uneven. Right first cheliped (Fig. 1E) with dactylus about 0.95 times as long as palm, terminating acute tip, cutting edge armed with row of low teeth interspersed by thin ridges; fixed finger terminating in acute tip, crossing with tip of dactylus, with cutting edge with row of low teeth interspersed by thin ridges; no hiatus present between dactylus and fixed finger (not shown); palm with dorsal surface smooth, lateral and mesial surfaces smooth, without granules or tubercles, ventral surface smooth; carpus cup-shaped; merus 1.86 times longer than greatest depth; ischium with dorsal surface uneven.

Third pereopod (Fig. 1F) robust, with ischium unarmed; merus weakly compressed laterally, 2.72 times as long as broad, with strong ventrolateral spine; carpus 3.00 times as long as broad, with spine on distal margin of flexor surface; propodus strongly compressed laterally, slightly narrow distally, with 2 rows of 8 spines and 2 distal spines on flexor surface; dactylus distinctly biunguiculate, 0.30 times as long as propodus.

Abdomen (Fig. 1A) rounded dorsally; four anterior somites with pleura broadly rounded; pleura of fifth somite rectangular posteroventrally; sixth somite with articulate, triangular, posteroventral flap.

Telson (Fig. 1G) about 2.52 times as long as posterior width; dorsal surface with 2 pairs of moderately strong spines; lateral margin slightly convergent in posterior margin; posterior margin strongly convex, with 2 pairs of spines at each posterolateral corner, mesial spines longer than lateral spines, exceeding posterior margin of telson. Uropod (Fig. 1G) with endopod overreaching posterior margin of telson; exopod with large movable spine just mesial to posterolateral tooth; diaeresis with about 20 small fixed spines.

Remarks. *B. gelasinifer* shares indented frontal margin of the carapace and exceeding posterior margin of the endopod of uropod against posterior margin of the telson with *B. granulimanus*, the only member of the genus *Betaeus* from Korea. The two species, however, can be readily distinguished by the morphological differences in the first pereopod and the diaeresis of uropod. The palm of the first pereopod in *B. granulimanus* has granules on the whole surfaces and its ventral surface is devoid of a shallow excavation, while, in *B. gelasinifer*, it is smooth, without granules, tubercles, or setae, and usually has a shallow excavation on the ventral surface. Moreover, the diaeresis of uropod in *B. granulimanus* has a tooth, while it is serrated in *B. gelasinifer*.

There is a greater morphological variation in the armature of cutting edges of the chelae of the first pereopods in *B. gelasinifer*. Based on the armature of the cutting edges and presence or absence of the hiatus between dactylus and fixed finger of the first pereopod in *B. gelasinifer*, Nomura and Komai (2000) separated the chela into four (A-D) forms. Two of these, C and D form chelae have been reported only for male specimens, and Nomura and Komai (2000), thus, suggested that the shape of the chela in the first pereopod in *B. gelasinifer* is sexually dimorphic. C-form chela is observed in the left first pereopod in Korean specimen from Ulleungdo Island. However, it is a female specimen from which the larvae hatched. Further specimens, therefore, will be necessary to check whether the shape of the chela in the first pereopod in *B. gelasinifer* is sexually dimorphic or not.

Type locality. Kominato, Boso Peninsula, Japan.

Coloration. Body and appendages uniformly transparent orange or pale olive green in life; fine dark orange spots on dorsal surface of body and appendages (Nomura and Komai, 2000).

Habitat. This species occurs back of rocky crevices in the intertidal zone, where it was emerged at low tide and also found between stones in an estuary (Nomura and Komai, 2000).

Distribution. Korea (Changseun and Ulleungdo Is.) and

Japan (Boso Peninsula, Miura Peninsula, and Shizuoka). This is the first report outside Japanese waters.

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REFERENCES

- Dana, J.D., 1852. Crustacea, Part 1, In United States Exploring Expedition during the years 1838, 1839, 1840, 1841, 1842, under the command of Charles Wilkes, U.S.N., 13, pp. 1-685.
- Holthuis, L.B., 1993. The recent genera of the caridean and stenopodidean shrimps (Crustacea, Decapoda) with appendix on the order Amphionidacea. *Nationaal Natuurhistorisch Museum, Leiden*, pp. 1-328.
- Kim, H.S. and W. Kim, 1997. Order Decapoda. In *The Korean Society of Systematic Zoology, ed., Lists of Animals in Korea (excluding Insects)*. Academy Publishing Co., Seoul, pp. 212-223.
- Nomura, K., K. Hagiwara and H. Ikeda, 1998. The alpheid shrimps (Decapoda: Apheidae) recorded from Kanagawa Prefecture, on the Pacific coast of central Honshu, Japan. *Natural History Report of Kanagawa*, 19: 39-48. (In Japanese with English summary)
- Nomura, K. and T. Komai, 2000. A new alpheid shrimp of the genus *Betaeus* from the Pacific coast of central Japan (Crustacea: Decapoda: Caridea). *Crust. Res.*, 29: 45-57.

Dana, J.D., 1852. Crustacea, Part 1, In United States Exploring

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